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# NUCLEAR SCIENCE ABSTRACTS



*1969 Annual Index*

**Part 2**

**Subjects**

A-1 Reactor to Neutrettos

UNITED STATES ATOMIC ENERGY COMMISSION  
Division of Technical Information

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Neutrettos  
N/C

**UNITED STATES ATOMIC ENERGY COMMISSION**

# **NUCLEAR SCIENCE ABSTRACTS**

**Volume 23**

**1969 ANNUAL INDEX**

**Part 2**

**Subjects**

**A-1 Reactor to Neutrettos**

**Division of Technical Information**

The Corporate Author, Personal Author, and Subject Indexes comprise three volumes. This three-volume set is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402 Price \$25.75

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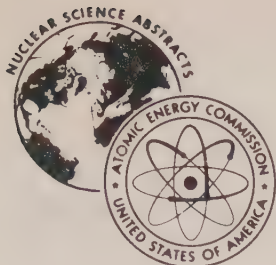
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# NUCLEAR SCIENCE ABSTRACTS

*A semimonthly publication of the, USAEC Division of Technical Information, Edward J. Brunenkant, Director,  
Published by the USAEC Division of Technical Information Extension, Robert L. Shannon, Extension Manager.*

*Nuclear Science Abstracts (NSA)* provides the only comprehensive abstracting and indexing coverage of international nuclear science literature. *Nuclear Science Abstracts* covers scientific and technical reports of the U. S. Atomic Energy Commission and its contractors, other U. S. Government agencies, other governments, universities, and industrial and research organizations. In addition, books, conference proceedings, individual conference papers, patents, and journal literature on a worldwide basis are abstracted and indexed. Each issue of *Nuclear Science Abstracts* includes four indexes: subject, personal author, corporate author (issuing organization), and report number.

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Numerous organizations, societies, and publishers throughout the world provide *Nuclear Science Abstracts* with advance page-proof copy of their publications, e.g., in the United States the American Institute of Physics provides page-proof copy of its publications.

A list of the journals scanned regularly and the abbreviations used appears in Issue 1 (January 15) of each volume of *Nuclear Science Abstracts* and is supplemented in Issues 7, 13, and 19. Issue 1 of each volume also describes the scope and arrangement of the subject matter covered in *Nuclear Science Abstracts*. The subject matter covered is also described in TID-4552, *Subject Scope of Nuclear Science Abstracts*, available free from the USAEC Division of Technical Information Extension, P. O. Box 62, Oak Ridge, Tennessee 37830. An outline of the subject categories appears in the Contents of each issue.

## AVAILABILITY OF PUBLICATIONS ABSTRACTED

The latest public availability of all U. S. Atomic Energy Commission reports is indicated in the report number indexes. The availability of other reports, when known, is also indicated. The availability of some unnumbered reports is given in the abstract.

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## INDEXES TO NSA

Comprehensive indexes appear in each issue and are cumulated semiannually and annually. Multivolume cumulations have been issued as indicated above.

All documents abstracted are indexed by subjects and personal authors. Technical report literature is indexed also by corporate author and report number. Each of these indexes in every issue is preceded by an introduction explaining in detail the organization of the index and the principles by which it is compiled. The reader is referred to these explanations for information not found in the brief summary below.

### Personal Authors

Each author's name is indexed in the form appearing on the document abstracted:

**ISHIHARA, T.**  
Accumulation of fallout  $^{137}\text{Cs}$  in newborn infants, 23:50538  
**ISHIHARA, Toyokuki**  
Shielding effect of paraffin, water, soil, concrete, Fe, and Pb for high-energy neutrons, 23:51748

### Subjects

The subject index consisting of specific materials, objects, and processes is arranged alphabetically. Modifying phrases specific to these subjects in turn are arranged alphabetically under the subjects.

**MELPHALAN**  
effects on proliferation of cultured antigen-stimulated spleen cells from mice, dose-response curve for, 23:50820  
**MEMBRANE FILTERS**  
design for removal of cell-free *Streptococcus faecalis* from bacteria cultures in fermentation tank, 23:49396 (UCRL-18667, pp 322-9)  
**MEMBRANES**  
radiation effects on nuclear, in salivary gland cells of butterfly larvae, 23:50355  
radiation effects on permeability of potassium ions through, of mouse ascites carcinoma cells, electron and x, 23:50817  
radiation effects on, in mitochondria of intestinal epithelial cells in mice, cobalt-60  $\gamma$ , 23:50816  
**MENDELEVIUM**  
separation from einsteinium and fermium by electrolysis, 23:49772 (UCRL-18667, pp 277-312)

separation from sodium acetate solutions by solvent extraction using sodium amalgam, 23:49772 (UCRL-18667, pp 277-312)  
stability of divalent state of, 23:49772 (UCRL-18667, pp 277-312)

### Corporate Authors

Technical report literature is indexed from the name of the organization or institution responsible for the issuance of the report.

**51093 (LA-4164) FABRICATION OF BORON CARBIDE RINGS AND DISKS.** Sheinberg, H.; Herrera, T.; Kostacopoulos, J. (Los Alamos Scientific Lab., N. Mex.). Apr. 25, 1969. Contract W-7405-eng-36. 11p. Dep. CFSTI.

is indexed as:

**LOS ALAMOS SCIENTIFIC LAB., N. MEX.**  
Fabrication of boron carbide rings and disks, 23:51093 (LA-4164)

### Report Numbers

Technical report literature is also indexed by report numbers. This index includes information on where individual reports may be obtained. While not reports, patents and conference papers are indexed here as a matter of convenience.

<b>JPRS-</b>	(Non-AEC)	
46949	23-51587	CFSTI
48330	23-52305	CFSTI
48331	23-52451	CFSTI
48481	23-50889	CFSTI
48743	23-51034	CFSTI
49025	23-51706	CFSTI (U. S. Sales Only)
<b>JUL-</b>	(German)	
571-RG	23-52269	Dep
578-PP	23-51624	Dep. CFSTI (U. S. Sales Only)
581-FN	23-51079	Dep. CFSTI (U. S. Sales Only)
584-RG	23-52313	Dep
586-FN	23-51035	Dep. CFSTI (U. S. Sales Only)
<b>K-</b>		
1777	23-50987	Dep. CFSTI
1778	23-50988	Dep. CFSTI
<b>KFK-</b>	(German)	
743	23-52461	Dep
743	23-52447	For translation see EURFNR-613
781/I	23-52462	Dep
824	23-52397	Dep. CFSTI (U. S. Sales Only)

# SUBJECT INDEX

Cross references are included in cumulative subject indexes and in *Subject Headings Used by the USAEC Division of Technical Information* (USAEC report TID-5001(9th Rev.))

The reader is also referred to *Guide to Abstracting and Indexing for Nuclear Science Abstracts* (USAEC report TID-4576).

Most headings in the subject index are specific materials, things, and processes. The headings are followed by modifiers that describe the properties of, or processes applied to, the headings.

All index entries cite *NSA* volume and abstract numbers; volume number precedes the colon and the abstract number follows it. The designation (R) following the abstract number indicates a progress report; (P) indicates a patent; and (T) indicates a translation. Abstracts for reports other than progress reports carry no letter designation. Report numbers, where applicable, are included in parentheses after the abstract number of the citation. Published literature (journal article or book) can be identified by the absence of a report number.

Ideas presented in the original literature, rather than key words, have been indexed. The indexers have selected what seemed the most probable and logical place to look for typical information. Since it is not always possible to anticipate where a user would look for information, the cumulative indexes include numerous cross references. Consideration of synonymous or closely related terms will prove valuable.

Information is indexed for the greatest use to the greatest number of users. This requires that a topic be indexed to headings that most specifically describe it and not ordinarily to the headings that describe its ultimate use or to the general class headings that include the specific headings. For example, information on boiler design for the Fermi Fast Breeder Reactor would be indexed under the headings BOILERS and FERMI FAST BREEDER REACTOR but not necessarily under the headings REACTORS, FAST or REACTORS, BREEDER.

General or broad headings are reserved for general summaries, reviews, comprehensive reports, and similar literature.

## Subject Heading Styles

Generally, the direct form of subject entry is used rather than inverted headings; e.g., AMINO ACIDS rather than ACIDS, AMINO; HELIUM ISOTOPES He-4 rather than HELIUM—ISO-TOPE He-4 or HELIUM—He-4 ISOTOPES. Note, however, that in some cases parenthetical modifying terms or inverted headings such as NEUTRONS, FAST, are used where the alphabetical arrangement of a direct entry would cause information to be scattered. In addition, organic compounds are usually entered in the index in the inverted form to facilitate grouping like or related compounds with the parent compounds; e.g., BENZENE, BROMO- rather than BROMOBENZENE. In general, the nomenclature used is that of the subject indexes to *Chemical Abstracts*.

## Alphabetization

Subject headings are alphabetized word by word. Parenthetical qualifiers, numbers, and Greek letters within subject headings are disregarded in alphabetizing unless there are two or more headings that are otherwise identical, in which case the qualifier, numerical progression, or spelled names for the Greek letters determine the order.

Examples:

M-Capture  
  see ELECTRON CAPTURE  
MAGNESIUM  
MAGNESIUM ALLOYS AND SYSTEMS  
MANGANESE FLUORIDES  
MANGANESE FLUORIDES MnF<sub>2</sub>  
MESONS  
MESONS ( $\pi$ )  
MESONS ( $\rho$ )  
1-PENTANOL  
2-PENTANOL

## Modifying Phrases

The modifiers appearing under a subject heading are written specifically to show the relation between the item being indexed and the heading. The modifier therefore contains a maximum of useful information. Although the modifier begins with the word judged to be of greatest use to the greatest number of users, there is still need for the searcher to consider all modifiers under the heading(s) of interest.

Modifiers usually form meaningful phrases when combined with the subject heading. Some are intended to be read following the subject heading, e.g., the entry HYDROGEN—sorption by charcoal should be read “hydrogen sorption by charcoal.” As a result of placing the important word first, however, many modifiers must be rearranged for smooth reading, e.g., FORM-ALDEHYDE—yields in radiolysis of ethyl ether, effects of deuterium on, should be read “effects of deuterium on formaldehyde yields in radiolysis of ethyl ether” and URANIUM—crystal structure of, effect of cooling rate on allotropic transformations in, should be read “effect of cooling rate on allotropic transformations in crystal structure of uranium.”

Special characters are added to modifiers in the fields of physics and reactor technology; if the modifier does not establish the experimental or theoretical character of a reference, a symbol (E), (T), or (E/T) is placed immediately after the modifying phrase and before the abstract number.



## Physical States and Configurations of Materials

The specific physical state, if other than normal, or the geometric configuration of the material is included in the modifying phrase; e.g., information on liquid metals is indexed under the specific metal with "liquid" in the modifier and carbon crucibles is indexed under CARBON with "crucibles" appropriately placed in the modifier. The information on carbon crucibles is also indexed under CRUCIBLES.

## Nomenclature of Inorganic Compounds

Inorganic compounds are indexed to subject headings in the direct form. Cations are listed in the order of increasing valence for polycationic salts of varying valence and in alphabetic order for polycationic salts in which all cations have the same valence; e.g., SODIUM ALUMINUM SILICATES and POTASSIUM SODIUM SULFATES. If more than one anionic species is presented in a compound, the anions are arranged alphabetically, e.g., BERYLLIUM FLUORIDE HYDROXIDES.

## Nomenclature of Organic Compounds

Organic compounds are indexed by subject headings based on the indexes to *Chemical Abstracts* except in the area of enzymes, in which specific enzymes, named according to the 1964 recommendations of the International Union of Biochemistry, are used. In many cases nonproprietary names for drugs are used as subject headings, and cross references are made from the systematic chemical names. Subject headings for hormones appear in the inverted style at HORMONES.

## Nomenclature of Life Sciences

Subject headings for plants are names of phyla with one exception: members of the Phylum Tracheophyta are indexed under class or subclass names. Scientific names (genus and species) are used as the initial, or file, word in the modifying phrase. Scientific names are omitted only when the name is not available in the literature or cannot be found in available references.

Subject headings for animals are the names of phyla with the following exceptions: (1) members of Phylum Arthropoda and Phylum Chordata are indexed under appropriate class name, and (2) common names are used for members of Class Mammalia.

Subject headings are entered for various classes of commodities, and specific products are identified in the file-word position of the modifier. In the following examples, approved subject headings are capitalized and typical modifier file words are listed in lower case.

Example 1	Example 2
CEREALS	MEATS
bread	beef
flour	fish
oats	mutton
rice	pork
rye	poultry
wheat	seafood

Diseases, pathological conditions, and in vitro studies of atypical cells and tissues are indexed under subject headings for the organism affected, under the appropriate anatomical structure of physiological phenomenon affected, and under the appropriate disease heading. Subject headings for diseases (defined as any deviation from the norm) are DISEASES; DIS-

EASES, INFECTIOUS; DISEASES, NEOPLASTIC; DISEASES, PHYSIOLOGICAL; DISEASES, PLANT; and DISEASES, TRAUMATIC.

Diseases of mixed etiology are treated in the following manner: neoplastic diseases that are also classified as infectious or physiological are indexed under DISEASES, NEOPLASTIC; diseases in which a microorganism is the etiologic agent are classified under DISEASES, INFECTIOUS; physiological anomalies that are neither neoplastic nor infectious are indexed under DISEASES, PHYSIOLOGICAL; the acute radiation syndrome, nonspecific radiation injuries, trauma, and wounds or incisions inflicted mechanically are indexed under DISEASES, TRAUMATIC.

Specific diseases or pathological conditions are named in the file-word position of the modifier, in the author's terminology, and are set off from the remainder of the modifier by commas. Neoplasms are designated as benign or malignant in the file-word position when more specific information is not available.

## Multicomponent Alloys and Other Systems

Multicomponent alloys and systems, except well-known trade names, are indexed under a subject heading for each component in the form "element systems" for nonmetals or "element alloys and systems" for metals. The modifier begins with element symbols for each component arranged alphabetically. In addition, if significance is placed on the base metal of the alloy, this is indicated by adding "-base" to the element symbol.

Example: A 1.5C, 12Cr, 0.25V, 0.8Mo, bal Fe alloy is indexed as

```
CARBON SYSTEMS
C--Cr--Fe-base--Mo--V, ...
CHROMIUM ALLOYS AND SYSTEMS
C--Cr--Fe-base--Mo--V,...
IRON ALLOYS AND SYSTEMS
C--Cr--Fe-base--Mo--V, ...
MOLYBDENUM ALLOYS AND SYSTEMS
C--Cr--Fe-base--Mo--V, ...
VANADIUM ALLOYS AND SYSTEMS
C--Cr--Fe-base--Mo--V, ...
```

Well-known alloys, such as ZIRCALOY-2, are indexed under the trade name; cross references from each component of the alloy to the trade name appear in cumulative indexes.

Multicomponent systems in which nonmetallic elements are present in large percentage and which are commonly referred to as systems or mixtures are indexed in a manner similar to alloys.

Example: A tungsten-silicon preparation is indexed as

```
TUNGSTEN ALLOYS AND SYSTEMS
Si--W, ...
SILICON SYSTEMS
Si--W, ...
```

Multicomponent systems and mixtures of inorganic compounds are indexed under the subject heading for each component compound; the modifiers begin with an alphabetical listing of compound formulas.

Example: A lead titanate-lead zirconate mixture is indexed as

```
LEAD TITANATES
PbTiO3--PbZrO3
LEAD ZIRCONATES
PbTiO3--PbZrO3
```

A mixed system of compounds and elements is indexed by a combined form of the preceding conventions; e.g., a dispersion of copper and alumina would be indexed as

ALUMINUM OXIDES  
Al<sub>2</sub>O<sub>3</sub>--Cu, ...  
COPPER ALLOYS AND SYSTEMS  
Al<sub>2</sub>O<sub>3</sub>--Cu, ...

Mixtures of organic compounds are indexed under subject headings for each component of the mixture; the modifiers begin with an alphabetical listing of compound names.

Example:

ACETIC ACID  
acetic acid--BF<sub>3</sub>, ...  
BORON FLUORIDES  
acetic acid--BF<sub>3</sub>, ...

Example:

BENZENE, CHLORO-  
bromophenol--chlorobenzene, ...  
PHENOL, BROMO-  
bromophenol--chlorobenzene, ...

If modifiers for alloys and systems are included with other modifiers under the same subject heading, they are filed last.

Example:

CARBON SYSTEMS  
deposition on nuclear fuel  
particles  
molecular structure of  
neutron total cross section for  
sorptive properties for xenon  
Young's modulus for  
Al--C--Cr, superconductivity in  
B--C, phase studies for  
C--U--Zr, fabrication and  
physical properties of

## Nomenclature of High Energy Physics

Information on particle-particle events is indexed under subject headings for the specific particles involved. The modifier file word *interactions* is followed by the specific interaction written in symbolic form. Particle nomenclature and symbols follow that of Rosenfeld, et al. *Data on Particles and Resonant States*, UCRL-8030 (latest revision). For consistency the incident particle is always written first. The mass (in MeV) of a resonance state is included in parentheses after the symbol to avoid ambiguity. Hyperfragments are indicated in modifiers as in the following examples:  $\Lambda$ -He<sup>5</sup>,  $\Sigma$ -H<sup>3</sup>,  $\Lambda\Lambda$ -Be<sup>10</sup>. The superscript on the right indicates the total number of baryons in the composite system.

Examples:

MESONS ( $\pi^-$ )  
interactions  $\pi^- + p + \Lambda + K^+ + \pi^-$  at 6 GeV/c in  
hydrogen bubble chamber,  $\Lambda K(1700)$  enhancement  
in, (E)  
BARYONS, RESONANCE ( $N^*$ )  
production of  $\Delta^{++}(1236)$  and  $\Delta^0(1236)$  from  $K^- +$   
 $p \rightarrow K^- + p + \pi^+ + \pi^-$  interactions at 2.63 and  
2.70 GeV/c, (E)  
HYPERFRAGMENTS  
binding energy of  $\Lambda\Lambda$ -He<sup>6</sup>, three-body  $\alpha \rightarrow \Lambda \rightarrow \Lambda$   
model for

Subject headings are also provided for specific models and theories.

Examples:

ELEMENTARY PARTICLE MODELS (TRIPLET)  
hadron total cross sections in quark, numerical  
analysis of  
CURRENT ALGEBRA  
PCAC hypothesis for  $A_1$  and rho dominance in  $\pi +$   
 $e + \nu + \gamma$  decay  
REGGE POLE THEORY  
predictions for polarization in  $K^- + p \rightarrow$  anti  
 $K^0 + n$ ,  $\pi^- + p \rightarrow \pi^0 + n$ , and  $\pi^- + p \rightarrow \eta + n$   
interactions at high energies  
SYMMETRY GROUPS  
 $SU(2) \times SU(4)$  intermediate-coupling model for  
nucleon and hyperon isobars

## Nomenclature of Reactor Technology

Subject headings for reactors are of three types:

(1) Specific reactors, e.g., ARGONNE RESEARCH REACTOR, SAXTON POWER REACTOR

(2) Reactors having a common physics or engineering characteristic, e.g., REACTORS, FAST; REACTORS, ORGANIC-COOLED; REACTORS, PRESSURIZED-WATER

(3) Reactors having a common purpose, e.g., REACTORS, POWER; REACTORS, RESEARCH

Information on specific reactors, type (1), is indexed under the one specific subject heading. Information on classes or types of reactors, types (2) (characteristics) and (3) (purpose), is indexed under all applicable headings. For example, information on a heavy-water-moderated organic-cooled power reactor is indexed under REACTORS, HEAVY WATER-MODERATED; REACTORS, ORGANIC-COOLED; and REACTORS, POWER.

Subject headings exist for selected reactor components, e.g., REACTOR FUEL ELEMENTS. When applicable, headings for components are indexed even though they may have been included in a modifier under a type (1) or (2) heading. The materials in reactor components are indexed when the information is peculiar to the material.

Modifier file words under reactor headings are of two primary types: one type expresses reactor characteristics, e.g., reactivity; the other, components, e.g., control rod. If no subject heading appears for a reactor component, the heading REACTORS is used, and the component is used as the modifier file word.





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## CP-4 Reactor

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(Solid object moving in interplanetary space considerably smaller than an asteroid and considerably larger than an atom or molecule.)

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